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System Dynamics Group

University of St.Gallen

Overview

The System Dynamics Group (SDG) is a research group at the Institute of Management of the University of St. Gallen, Switzerland. SDG is dedicated to the modeling and dynamic simulation of complex systems. It goes back to pertinent research and teaching activities since the middle of the 80s.

The System Dynamics methodology distinguishes itself from other methodologies for the analysis of complex issues, by the modeling of feedback structures, by means of which system-inherent nonlinearities can be captured. In this context, the inclusion and simulation of temporal delays as well as probabilistic functions play important roles.

In its applied research the SDG cooperates with companies and other organizations. Qualitative and quantitative models and methods are employed for a successful solution (or dissolution) of complex issues and problems. Examples:

- Overall steering of a company in the pharmaceuticals industry
- Model for the management of product launches for a durable consumer goods company
- Strategy- and investment models for small and medium sized enterprises
- Developments of corporate simulation models ("micro worlds") for training purposes

In the domain of a basic research conceptual studies and methodological development are undertaken, in dissertation projects, among others. In certain instances cases from the applied research can be used for the development of generic models. Examples:

- Theory building with System Dynamics
- Fundamentals of model based management
- The formation of norms in social systems

Objectives:

We aim at making substantial contributions:

- to progress in the state of modeling and simulation of complex dynamic systems with an emphasis on social systems, namely companies and other organizations (public organizations, non-profit-organizations, social initiatives)
- to the application of System Dynamics in research and practice
- to the education of advanced users of the System Dynamics methodology

Research:

Besides our studies inside the University of St. Gallen we maintain cooperations as international research groups, among them:

- System Dynamics Group at Massachusetts Institute of Technology (M.I.T.)
- System Dynamicists at the London School of Economics
- System Dynamicists at the University of Valladolid

Besides this, M. Schwaninger is also managing editor of the System Dynamics Review (SDR), the leading research journal of the international System Dynamics Community.

Practice:

The System Dynamics Group at the University of St. Gallen cooperates with diverse companies and institutions of public administration. Among these partners are:

- Accenture
- Allgaier-Gruppe
- Cilag
- Daimler
- Swisscom

Teaching:

Bachelor-Level

- Course *System Dynamics: Tools for systemic modeling and simulation*
- Supervision of Bachelor Theses

Master-Level

- Course *Modeling and Simulation with System Dynamics: Tools for Dealing with Complexity*
- Course for international students: *Coping with Complexity: Management Simulation with System Dynamics*
- Supervision of Master Theses

Doctoral-Level

- Doctoral Seminar *System Dynamics*
- Supervision of PhD dissertations
- Coaching in System Dynamics methodology for doctoral students

Executive Education

- Executive Seminar: *Management of Complexity*
- Executive Seminar*: Project Dynamics*